



Book Reviews

REVIEW ESSAYS

An Anthropology of Chocolate

Chocolate in Mesoamerica: A Cultural History of Cacao. Cameron L. McNeil, ed. Gainesville: University of Florida Press, 2006. 542 pp.

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This major work brings together archaeologists, botanists, and ethnographers in a series of chapters on cacao in Mesoamerica. Cacao was central to the economic, cultural, social, artistic, and, above all, ritual life of ancient Mesoamerica, and it continues to be very important in all these capacities. It has also, of course, become a major world crop. This book includes 21 long, detailed chapters of a uniformly high standard. Anyone fearing an "edited volume" need have no dread in this case. The chapters are readable, data rich, and of a high scholarly standard. The chapters are also highly technical; this is not a popular history like the Sophie Coe and Michael Coe's deservedly famous *True History of Chocolate* (1996). The present book brings us up to date on findings since that work. It does not replace earlier botanical works or other popular writings; it consists instead of specialist accounts of the current state of the field of cacao studies.

This book is a triumph of four-field anthropology. Botany, archaeology, linguistics, ethnography, and a small bit of physical anthropology are seamlessly united. Many authors use information from all the "subfields," but more importantly, experts in each subfield work together to produce a unified book that covers cacao in all its aspects. This book should stand as proof that four-field anthropology not only lives but still has enormous value. Without integration of the fields, few or none of the interesting conclusions in this work could have been reached. Different streams of knowledge cross-correct, cross-confirm, and mutually support each other, wiring down conclusions that could not possibly have been reached by people working in one specialty alone. Anthropology is still one, and the best anthropology still draws on knowledge from all four subfields.

Similarly, the book integrates articles that range from the purely biological (much of chs. 2 and 3) to Betty Faust and Javier Hirose's brilliant symbolic and interpretive study of cacao in ceremonies (ch. 20). Again, an adequate account of chocolate must draw on that range of expertise. I would strongly recommend this book to anyone dealing with divisive tendencies in an anthropology department.

Cacao (*Theobroma cacao*) seems to have come from South America, but whether naturally or not is unclear. Authors herein lean toward the idea that it spread north long before humans arrived on the scene. Others have postulated deliberate introduction, and this is not ruled out so far. Most or all of the process of domestication seems to have occurred in Mesoamerica. Many species of the genus and the closely related genus *Herrania* occur in South America and are used in the region for many purposes, reviewed herein by Nathaniel Bletter and Douglas Daly (ch. 2). Pataxte (*T. bicolor*) is the only species that occurs northward with *T. cacao* into Mesoamerica. An unfairly neglected plant, pataxte gets its due here at last from Johanna Kufer and Cameron McNeil (ch. 4). It is still used for drinks, rituals, and other purposes but was once much more important than it is today. Also reviewed here, by Nisao Ogata et al. (ch. 3), are the fascinating genetics of cacao and the many and varied plants used with cacao in the chocolate drinks of Mesoamerica. Ogata's work has been truly revelatory, and one hopes for much more from him.

In spite of folklore, cacao has little to offer besides a moderate amount of theobromine (a molecule very slightly different from caffeine but having the same virtues). It is not aphrodisiac, although the combination of sugar and stimulant in commercial chocolate may energize some people. (There is no believable evidence one way or another for the claim that phenylalanine stimulates love.) Chocolate is not addictive, "chocoholics" to the contrary notwithstanding. In my experience, chocoholics seem to prefer sweet confections that actually are low in chocolate content, not the bitter 80-percent cacao stuff. We would expect, if chocolate were actually addictive, that addicts would

rapidly progress from ordinary candy bars to massive consumption of 80-percent bars and, ultimately, to 100-percent bitter chocolate. What I observe instead is a tendency for chocoholics to prefer items high in flavor but low in actual cacao content. We are dealing with a social construction here, not a physical addiction.

The word *cacao* is a Proto-Mixe-Zoquean root that seems essentially unchanged over thousands of years; the reconstructed form is *kakaw* or *kakawa* (Terrence Kaufmann and John Justesen, ch. 6). Attempts to show a Nahuatl origin do not work. We are still waiting for some sage to figure out how the Nahuatl word *chocolatl* arose. It appears to be rather new; the word is not attested before the late 16th century. It may have originally been *chikolatl*, which would drive the last nail into the coffin of the folk etymology from Maya *choko(l)* "hot." Our word *cacao* seems to have come from Nahuatl *cacauatl*, another name for the chocolate drink, but I believe a direct borrowing from Maya should not be ruled out. *Cacahuatl* became the name for the beans, too, which led to the modern Spanish term *cacahuate* for peanuts, originally (probably) *tlalcacahuatl*, "earth cacao-beans."

Probably every reader of this journal knows that cacao beans were the money of ancient Mesoamerica. We have useful price lists from Spanish colonial times in Nicoya (Larry Steinbrenner, ch. 12) and central Mexico, where a porter earned 100 beans a day, which gave him more buying power than the modern workers of the area (Manuel Aguilar-Moreno, ch. 13). As a currency, cacao beans were ideal: portable, convertible, fungible, and highly valued, but also useful. Moreover, they spoiled in time, making miserliness difficult. And, of course, "money grew on trees." One might advocate returning to the cacao-bean standard today.

Several archaeological chapters bring us up to date on cacao—its detection (Jeffrey Hurst, ch. 5), language, iconography, and symbolism—in various regions of Latin America. John Henderson and Rosemary Joyce try to find the beginnings in early formative times (ch. 7). David Stuart (ch. 9) reviews the decipherment of the Primary Standard Sequence (PSS). I remember that in my student days, this sequence of Maya hieroglyphics, found on countless cups and beakers, was always assumed to be a powerful spell or sacred ritual prayer: after all, the Maya were devout, peaceful, religious people. (I am happy to say that my teacher in such matters, Gordon Willey, maintained a healthy skepticism about this.) The PSS turned out to mean "this is So-and-so's chocolate cup." At best, we get "pure chocolate" or "foaming chocolate." (Chocolate was foamed, often with foaming agents, to get the solids into suspension.) So much for romance.

However, several chapters show the vital importance of cacao and cacao trees in art. Simon Martin's chapter on religion (ch. 8) is particularly rich. Cacao trees become crocodiles or vice versa. The sacred cacao tree can even be the curl-snouted First Crocodile from which the world emerged. Cacao trees equate to, or are parallel with, maize, and, thus, humans. The maize god, who was equated with

Jesus from early colonial times, is thus involved with cacao, and tales of Jesus and cacao are still with us (see, e.g., p. 164). Indeed, cacao seems to occur at the center of the most complex and multiply symbolic artistic and mythic scenes in Mesoamerica. Dorie Reents-Budet (ch. 10) shows us some of the stunningly beautiful vessels for chocolate. One (p. 218), as fine a piece of ceramic painting as exists in the world, was signed by a royal prince. Decorating chocolate vessels was serious art, not anonymous craft. McNeil, Hurst, and Robert Sharer document in detail what we know about cacao in Copan; we now have many vessels with chocolate residue.

Colonial history reveals involvement of cacao in the trade and conflict of indigenous and Spanish societies. Cacao trade helped the Itzaj state hang on in northern Guatemala for 200 years after the "Conquest"; it was probably the longest-surviving truly indigenous state in the New World, falling at last in 1697, partly because the Spanish brutally subdued its cacao trade partners (Laura Caso Barrera and Mario Aliphat, ch. 14). Meanwhile, the Spanish developed cacao in El Salvador, where both pre- and post-Conquest cacao raising was a complex matter with interesting changes of ownership patterns (William Fowler, ch. 15). At some point, the Spanish converted a drink made with toasted corn and chiles to a drink heavily sweetened with sugar. The old corn-and-chile products survive in indigenous and mestizo communities and certainly stand on their own as superb drinks. The now-famous use of chocolate in *moles* (Nahuatl *molli*, "sauce") may be post-Conquest or may not (ch. 17). I might add that the best-known chocolate mole, *mole poblano*, is a "Moorish" dish, still common in Morocco, to which New World ingredients—chile, chocolate, and so forth—were added in Puebla, apparently in the 17th century. Local tradition there credits it to certain nunneries. It was not the only fusion of Mexican and Moorish; Puebla's stuffed peppers are also an adaptation of standard Near Eastern and Arab-Andalucian vegetable-stuffing to New World ingredients. The new dish crossed back to Spain and is found today in Extremadura, whence came so many of the conquistadores.

There follows a series of articles on chocolate in colonial times, and several on ethnography of uses among the most traditional indigenous communities. These include some exceptional ethnobotanical ethnography. Cameron McNeil provides an overview (ch. 17). Janine Gasco brings us up to date on her long-running, intensive research on cacao in Soconusco (coastal Chiapas). This area was the Chocolate Coast for the Aztecs, but it declined slowly and erratically in Spanish times, ultimately crashing in recent centuries. Gasco is working hard to restore at least some of the Soconusco's glory. Timothy Pugh describes the Lacandon ritual uses (ch. 18); Johanna Kufer, with Michael Heinrich, does the same for the Ch'orti' (ch. 19). In a really superb job of ethnography, Betty Faust's longtime friend and consultant Don Pedro Ucan Itza of Pich, Campeche, explores the ritual uses of cacao (Faust and Javier Hirose, ch. 20). Faust and Hirose explore not only the actual behavior and statements involved but also the whole symbolic

system behind these, which goes back to far earlier times and has ramifications that tie together this entire book. Finally, Patricia McNany and Satoru Murata (ch. 21) take readers through the history of cacao in Belize, especially its reinvigoration by the Green and Black Chocolate Company, whose fair-trade-certified, wonderfully flavorful chocolate bars may be familiar to readers who frequent well-stocked markets.

Cacao thus emerges as a plant at the very heart of Mesoamerican indigenous life—central to religion, art, daily life, economy, and the whole business of living. Mesoamericans of pre-Columbian times, and many indigenous ones from then to the present, have a total personal involvement in cacao that rivals the involvement of French and Italians in wine. (One can even make an alcoholic drink from the pulp around the beans, but it seems not to have been very important, if indeed it was used at all, in Mesoamerica; it is more a South American delicacy.)

With minor exceptions (Gasco on Soconusco, McNany and Murata on Belize), this book does not cover modern commercial production and consumption. Part of the reason is that there is very little to cover. Mexico, especially Tabasco, still produces significant amounts, and it is trying to develop the industry in other states, from Chiapas to Guerrero. Mexico's chocolate industry suffered from neglect and poor quality control for decades. Today, quality is rapidly improving, and production of organically grown chocolate is becoming locally significant. A major problem is that the wonderful old *criollo* strains are gone or nearly gone; salvage is under way where they still occur (Ogata, Gasco, McNany, and Murata report on this). Much of the cacao now produced is run-of-the-mill stuff, and commercial chocolate tends to be heavily cut with sugar and other substances. The world market for high-quality chocolate and organically grown products is changing this, but diseases, high production costs, climate change, and other factors cause difficulties. Meanwhile, Africa has such a huge lead in production of standard-grade chocolate that catching up is hopeless under present political-economic conditions. Cote d'Ivoire, which produces much of the world's chocolate, notoriously keeps its costs low by using child slave labor. Ironically, many of the great chocolate companies began as Quaker firms that wished to find a product not produced by slaves. The rebirth of chocolate in Mesoamerica and the development of a true quality industry worldwide must await the coming of major reforms in labor conditions, worldwide pricing, and quality standard-setting.

Trying to find something to criticize in this book is a difficult task. There are some lapses of the pen; the only one worth remark is citing "mid-twentieth-century" uses of chocolate to Bishop Landa (p. 239). Typos and such are virtually nonexistent, let alone errors of fact.

One slight problem concerns transcriptions. This book, like many recent books on or related to Maya archaeology, mixes Mayan transcription systems. Traditional Spanish colonial systems and the modern uniform system in use since the late 1980s are hopelessly mixed, not only in the book as a whole but often in the same paragraph or even in the same word. We find *hmeno'ob* as the plural of "healer"; it should be either *hmenoob* (traditional) or *jmeno'ob'* (new). Similarly, "*k'ax*" for "forest" should be either *kax* or *k'aax*.

Worse is the ridiculous ethnonym usage, followed herein, of the Project for the Documentation of the Languages of Meso-America. It overcorrects Spanish words into pseudo-phonetic spellings. *Yucatec* becomes "Yukatek," *Huasteco* becomes "Wasteko," and so on. Yet these are Spanish geographical terms, not native words. "Yucatec" is a wondrously confused Spanish mix-up of languages, "Huasteco/a," a Nahuatlism for the Tampico area. Neither is an ethnonym. The "Yukatek" of this book are the original Maya, the people who actually call themselves that (more accurately, *Maaya*). They use the word "Yucateco/a" not for themselves alone but for any person residing in the Yucatan Peninsula. The "Wasteko" of this book are actually the Teenek, called "Huastec Maya" in much of the English-language literature; again, they would use "Huasteco/a," in its proper sense, for any person inhabiting the Huasteca. Other examples could be mentioned. Consistency is impossible because the terms are spelled the right way (Spanish does have a standardized spelling system) when they are being used in their normal-world sense as geographic terms. It is only when they are (wrong) ethnonyms that they are spelled neologically. I humbly request that these terms remain in their correct Spanish forms. Probably we should use actual ethnonyms—*Maaya*, *Teenek*, and so forth—to talk about linguistic groups. After all, we have gotten used to referring correctly to the Purhepecha (instead of "Tarascans") and Raramurí (instead of "Tarahumara").

Other than this trivial point, the book is a model of ethnobiology and Mesoamerican studies. It deserves to be read by all specialists in those areas.

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Ethnography Goes to Market

Conference Proceedings: EPIC 2006, *Ethnographic Praxis in Industry Conference*, 24–26 September, 2006, Portland, OR, USA. Tracey Lovejoy and Ken Anderson,

organizers. Washington, DC: American Anthropological Association, 2006. 305 pp.

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I begin this review with a personal disclosure, as an alert to the bias informing my remarks. Like most readers of this essay, I am at once an enthusiastic participant in and conscientious objector to contemporary consumer culture. An applied anthropologist, I have spent the past quarter-century as a business school professor, teaching aspiring, neophyte, veteran, and executive managers not only how to understand the cultural ecology of marketing but also how ethically to exploit and effectively to defy marketing's technology of influence. I have been an active consultant across a range of industries and countries during this time as well. My research interests include consumer behavior, spectacle, placeways, and creativity.

While I have found both my academic and consulting work at times to be as frustrating as rewarding, they have almost always been mutually illuminating on many dimensions. Sometimes the luxury of time trumps the luxury of access and funding, sometimes not; sometimes the latter can beget the former, sometimes vice versa. Experience gained in one venue is applied in the next, such that long-term immersion in related phenomena, multisite ethnography, and rapid ethnographic assessment conspire to shape the diagnostic research that characterizes proprietary projects and catalyzes the academic ones. I view ethnography as an elastic enterprise.

As a professor, a consultant, and a disciplinary interloper, I strive to be aware of the teachable moment, that opportunity to bring theory and method to bear on a relevant issue that has previously bedeviled or altogether eluded my client, whether sophomore or CEO. Ethnography easily reveals this moment in environments long dominated by operations research, economics, or psychology and limned by statistics, focus groups, or aesthetic intuition. But early in my career, persuasive solutions demanded opportunistic personal intervention or creative thought experiments, either handily enough discounted as anecdotal or speculative by skeptical audiences. Hoary examples from our discipline's early embrace of and episodic flirtation with industry, their timeless relevance apparently belied by copyright date, failed to generalize for new generations of managers. Effective recruitment or conversion has awaited the proliferation of teachable texts, of exemplars of relevant research resolving or revealing commercial issues of the kind comprising the proceedings to which I now turn.

This volume emerges from the second annual Ethnographic Praxis in Industry Conference, a gathering of practitioners and academics whose applied focus on business has become the site of so much accommodation and resistance in our discipline in recent decades. The book roughly reflects the conference structure, which explored the theme of "transitions," as it impinges increasingly on industrial ethnographers and their clients, in cultural, social, and quotidian perspective. The conference, a strategically brief affair that celebrates the current status of ethnography as

the methodological darling of the market research industry broadly construed, is even more a ritual performance of nascent communal identity. As both diction and acronym attest—a heroic brand name with learned resonance—the sweep of the conference is grand and the scope of its proceedings wide. With industry organizers and National Association for the Practice of Anthropology (NAPA) backing, the book captures something of the excitement of the event and speaks both to producers as well as consumers of ethnographic work.

Like any proceedings volume, this one is both blessed and cursed by its format. For one-stop shopping in a strange bazaar, it is a useful—if selective—guide. Rushed to print for a market for whom freshness dating and shelf life are critical considerations, the packaging dents and dings of typographical error seem less annoying (even when chapters are misnumbered) than they might in a traditional monograph. The contents themselves are fully blown, in all senses of the metaphor, yet even the weakest do not miss entirely, as they often contain a nugget of insight that helps the reader grasp the contours of the field. With some exceptions, shorter chapters provoke without satisfying while longer ones provide just enough empirical, theoretical, or stylistic incremental advance to convince the reader of the promise of the enterprise. The inclusion of abstracts from workshops and posters intrigues and tantalizes even further and gives the reader a sense of the breadth of coverage even a circumscribed topic elicits from these practical researchers. No index is appended to the volume, which inhibits surgical striking in an era of time famine. Perhaps the most valuable aspect of the format is the roster of biosketches, which includes e-mail addresses of contributors, who are thus sure to be petitioned for papers, advice, network access, and job interviews as a result. Lamentably (and inexplicably for a savvy set of entrepreneurs with such an audacious brand), the pedestrian cover art is a missed opportunity to promote the field, even if the logos of corporate sponsors are banished to the back.

Although the contents are parsed across topical, procedural, and institutional issues, many of the chapters are an engaging mélange of shrouded discovery (an artifact of the "proprietary shackles," in Reichenbach and Maish's evocative phrasing, that sorely and often inappropriately limit the diffusion of current, relevant examples into the literature), methodological advice, philosophical meditation, and paean to serendipity. The all-too-brief keynote chapter by Grant McCracken, perennial paladin of this post-modern profession, sets the tone for much of what is to follow. Chiding the field for its surfeit of charlatans, he advocates a 19th-century solution to a 21st-century problem: in lieu of certification, legitimate practitioners would deposit the "extra data" from proprietary studies (i.e., ancillary discoveries not compromising clients) into blog-based "Notes and Queries," accessible by all on the Internet. This retrowiki remedy for Gresham's Law is vintage McCracken: acerbic, ironic, and elegant. The balance of the empirical and methodological chapters strives to meet

these touchstones of insight, authenticity, and managerial relevance, while substantive chapters on disciplinary development favor issues of legitimacy. Surprisingly, McCracken's considerable body of scholarly work is not invoked by contributors, despite its relevance to most of their pursuits. My readers will hear a variant of this lament again.

Topical chapters are set in a variety of research contexts: healthcare, design, online shopping and dating, pharmaceuticals, forecasting, financial services, personal computers, domestic objects, telematics, space, and place. The weakest chapters fail to capture conditions like the lived experience of illness or the many sophisticated precedents for and nuances of the cultural biography of goods. Midrange contributions produce unsurprising findings and uninspired applications of basic research. The strongest chapters deliver the most ethnographic detail, insightfully interpreted and creatively translated into managerial applications. John Wendel and Lisa Hardy succinctly and comprehensively describe the promises and perils of clinical trials. Rachel Jones provides a detailed folk phenomenology of illness that is rife with practical applications. Nimmi Rangaswamy and Kentaro Toyama explore the promise of information and communication technology in rural India in glocal perspective. Jones and Martin Ortlieb accomplish the trifecta of thick empirical description, rich theoretical interpretation, and creative actionable application in their study of emplacement of courtship rituals in cyberspace, resulting in what is perhaps the volume's signature topical contribution.

Methodological chapters are more disappointing than their empirical counterparts. Some studies employ no ethnography at all but, rather, report on focus groups, home visits, interviews, and surveys. Others merely advocate the standard battery of procedures in the ethnographic toolkit. A few introduce some useful wrinkles (e.g., proxy assessment, employment of nonethnographers, negotiation of informed consent) that may be unfamiliar to students but are common fieldwork practices. Of particular interest is the chapter by Ken Anderson and Rogério de Paula, which is a wonderful little confessional tale of a sequence of experiences every anthropologist has enjoyed: the "always on" sensation of no downtime in our profession that encourages us toward emergent design, lateral thinking, and the embrace of serendipity that often results in insight.

The chapters devoted to institution building and disciplinary reflection are the ones I found to be most rewarding. These chapters perhaps best reflect the face work and corridor talk that I imagine to be the lifeblood of any fledgling professional conference. The transcription of the panel discussion between luminaries Jeannette Blomberg, Tim Malefyt, and Lisa Robinson, as moderated by Tracey Lovejoy, is the most cogent presentation of the state of the field to be found in the book. It is at once a humorous, enlightening, and inspiring catalog of the field's achievements and prospects. Jones's chapter on the utility of experience models in ethnographic design research is a useful entrée

into one of the most exciting current business frontiers. One of my favorite chapters in the volume is Nina Wakeford's provocative, counterintuitive defense of PowerPoint, which she mounts via ethnographic analysis of "thick PowerPoint events" to illuminate the culture-building effect of one of our most pervasive rituals. Paired with Elizabeth Tunstall's poetic musings on communications channels, we get a rare glimpse into our own professional behaviors. My other favorite chapter is an eloquent meditation on ethical impulses in applied ethnography by Melissa Cefkin, who filters her inquiry through the eyes of our intellectual ancestors to truly clarifying effect. It is a wise and witty reflection on the aims of the field.

Even though I regard the publication of this proceedings volume as a cause for jubilation and rejoice at the thought of the EPIC conference becoming a recurrent event, I am troubled by the insular character of what is otherwise an exemplary entrepreneur's cookbook. In fairness, the call for participation in the conference is well broadcast, and the rejection rate is respectable, so the editors are beyond reproach for not assembling the book that might have been compiled. Many of the usual suspects contributed to the volume, and those that did not may well participate in future efforts, given the hectic pace and unpredictable rhythms of business life. What concerns me more, judging from the citation bases of the articles, is the absence of awareness—or, possibly, the disregard for the relevance—of the enormous amount of ethnographic work that is generated beyond the pale even of these badlands of the anthropological literature, on the part of the authors. Quite a few ethnographers dwell in unexpected villages and produce accounts of behaviors of interest not only to businesspeople but also to scholars of contemporary consumption, contributing to a comprehensive understanding of marketplace behavior. There are more noses under the tent than this volume would suggest and more still to be invited.

Interested readers—and, especially, those students whose careers will inevitably hinge on their ability either to practice ethnography in applied settings or broker cultural theory and ethnographic methods to professional school clients—should familiarize themselves with the many anthropological contributions to literatures in marketing (including advertising), management, and finance that have been made over the last several decades. A cursory inventory of resources would include books for primary insight and rich source material (e.g., McCracken 2005; Sherry 1995; Sunderland and Denny 2007; Zaloom 2006); articles in academic journals (e.g., *Journal of Consumer Research*, *Journal of Consumer Culture*, *Consumption Markets & Culture*, and *Journal of Marketing*); and conference proceedings (e.g., from the Association for Consumer Research, the Consumer Culture Theory group, and the Marketing Science Institute, whose 2006 Business Insights from Consumer Culture [Avery 2006] conference summary will be of particular interest). As long as our efforts are confined to silos, the goal of identity, community, and discipline building is restricted

to fits-and-starts (re)development, and the impact that applied ethnography stands to make on business and social science fields is blunted. No matter our worksite, we all like to talk shop: it is in our anthropological genes. I would just like to foster broader, cooler conversation.

Because of its relatively heavier emphasis on theory and method than on ethnographic detail, the *EPIC* volume will be of more interest to ethnographers in conventional social science departments than to those either in industry or business schools. As a secondary text in courses in research methods, in economic and applied social science, or as a recommended reading in introductory courses seeking to give students a sense of the practical value of their discipline, this book will find good use. Perhaps its true value lies in its artifactual, iconic status as a totemic contribution to the movement from which it has arisen and that it currently embodies. It marks more than the "liminal moment" its editors modestly claim for its disciplinary matrix. It is another entry in a growing library of indications that we have long traversed that commercial threshold with practical consequence and theoretical aplomb. Expect our next

wave of entrepreneurial researchers to prod the subcultures of acronymia to coalesce and to reveal the impact our studies of production, consumption, distribution, and divestiture (and all their attendant nuances) will continue to have on all five fields of anthropology.

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Going Global: Let Past Serve Future?

The Archaeology of Global Change: The Impact of Humans on Their Environment. Charles L. Redman, Steven R. James, Paul R. Fish, and J. Daniel Rogers, eds. Washington, DC: Smithsonian Institution, 2004. 292 pp.

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The Archaeology of Global Change is an important volume both for its well-organized contents and for what its title implies for the future of archaeology. Archaeologists have long been doing cross-disciplinary, multidisciplinary, and interdisciplinary research. We have been investigating coupled natural and human systems, modeling human ecodynamics, and expressing concern about long-term human impacts on environment long before any of these research strategies became buzzwords in the funding community. Since at least the 1930s (and in some areas since the 1890s), archaeologists have closely cooperated with geologists, soil scientists, biologists, climatologists, and a host of other natural and physical scientists on a regular basis. Many of us today identify ourselves as zooarchaeologists, geoarchaeologists, or archaeobotanists, and a host of isotopic and ancient biomolecular approaches are rapidly transforming our understanding of the human past. Although the naïve scientific worship of white coats and the uncritical affection for simplistic physics-based models of the early processual years has worn thin under postprocessual critique, most modern archaeologists of any theoretical persuasion are today very

comfortable working with hard scientists and are very at home in multidisciplinary teams in the field or lab.

Most archaeologists are also concerned global citizens, and like other anthropologists they have been increasingly active in finding ways to apply their expertise and data sets to current issues of human-environmental interaction now commonly subsumed under the term *global change*. Carole Crumley's influential 1994 edited volume *Historical Ecology* included a "Santa Fe Statement," representing a clear early declaration that no sustainable future was possible without a well-understood past. Archaeologists have correctly recognized the importance of providing a long-term perspective to current landscape and resource management efforts that are typically suffering from the limitations of short observational series. (For example, the unsuccessful managers of the North Atlantic cod fisheries began their data sets with 1903 as a pristine baseline, despite hundreds of years of prior impact, with disastrous results both for cod and humans.)

Archaeologists have also been very successful in getting funded by the U.S. National Science Foundation and related agencies, not only through Dr. Yellen's long-standing archaeology program within Social Behavioral and Economic (SBE) directorate but also in the new large-scale, cross-cutting special competitions like Biocomplexity in the Environment (BE) and the new Human and Social Dynamics (HSD) programs, which are designed to cut across normal academic disciplinary boundaries, sponsor large-scale integration of social and natural science approaches and data sets, and produce syntheses that have direct bearing on modern real-world problems. Some NSF budget figures may

provide some perspective on the current and potential impact of these programs on the conduct of archaeology in the United States (all budgetary information from NSF website, <http://nsf.gov/awardsearch>). Dr. Yellen's longstanding program within SBE has been essentially flat-funded for many years with a total budget around \$4.5–5.0 million, with most supported projects totaling less than \$150,000 and a practical maximum project total funding cap of around \$250,000. However, during the 2000–05 Biocomplexity (BE) competition, six archaeological projects were successful in landing over \$4.6 million in total, with some individual projects collecting sums equal to half of the entire SBE annual archaeology budget (several contributors to this volume are also BE project private investigators).

In other parts of NSF (notably the Office of Polar Programs [OPP]), archaeology-heavy interdisciplinary projects have been funded since the early 1990s, with some budgets near the million-dollar mark and average total project funding around \$300,000. The success of archaeologists in putting together fundable teams of collaborating scientists capable of working across the artificial natural science–social science fault line has actually led to archaeology being banned from some NSF competitions (such as OPP Arctic System Sciences program) because archaeologists were seen as simply too competitive and too much money was going to archaeology at the expense of other social science projects. Abroad, major EU and U.K. funding has gone in recent years to large-scale, multi-investigator projects aimed at directly connecting past and present cultural and natural landscapes. The ARCHIMEDES project discussed by Sander Van Der Leeuw and colleagues in this volume is a highly significant example of such sustained large-scale EU funding, and the U.K. private Leverhulme Trust has dedicated over \$4 million to interdisciplinary investigations of long-term human ecodynamics over the past five years. There is thus no question that the *Archaeology of Global Change* is a timely volume, as global change funding is now clearly a third force in support for world archaeology, falling somewhere between the levels of existing research funding (such as NSF SBE) and support for contract and mitigation cultural resource management work.

The volume is not only timely but also nearly self-reviewing, with well-structured general introductory overview by Charles Redman, Steven James, Paul Fish, and Daniel Rogers; a set of summarizing and synthesizing chapters at the end by Daniel Rogers, Paul Minnis, Tim Kohler, Emilio Moran, and Patty-Jo Watson; and summarizing headings for the four groupings of chapters (*Habitat Transformations and Animal Extinctions*; *Effects of Agriculture and Urban Society*; *Climate and Agriculture in the "Fragile" Southwest*; and *A View from the Past*). Unsurprisingly, given the history of research in North America, there is a strong explicit focus on the long-researched and well-dated history of human–landscape interaction in the American Southwest, but Oceania, North American Plains, Mesoamerica, Europe, and the Middle East are also represented in the case studies. Some articles provide a regional overview (Patrick Kirch

on Oceania, Redman on Mesopotamia), while others summarize the results of long-term projects (Van Der Leeuw et al., Joel Gunn et al., and O'Hara and Sarah Metcalfe) or focus on specific problems (Paul Miller, Steven James, Paul Martin, and Christine Szuter).

The Southwestern-focused part 3 has a certain amount of repetition of basic environmental data, but the four chapters in this section (by Suzanne Fish, Paul Fish, Jeffery Dean, and Tim Kohler) successfully take on different aspects of human–landscape interactions regularly constrained by scarce water. In the closing synthetic sections, Rogers provides suitably stirring call to action (entitled "The Global Environmental Crisis: An Archaeological Agenda for the 21st Century"), Paul Minnis examines biodiversity issues from an archaeological perspective, and Kohler offers another approach to looking at the persistent issue of population and resource interaction. Patty Jo Watson ends with a thoughtful perspective on where we have been and where we may go as contributors to global environmental science.

Like any edited volume, there is some unevenness in the chapters, with some clearly drawing on deeper research resources than others, but overall the book stands as both a solid review of important archaeological contributions to global change research and a well-articulated call for further efforts. Some general principles of wider application that may be drawn from the collection include:

1. *Chronological control counts.* Effective interdisciplinary collaborations turn on cause–effect linkages that require precise temporal definition and high-resolution chronological control. Being able to deliver tree-ring scale (vs. radiocarbon scale) chronological control is certainly a critical factor in the success of the Southwestern research programs. When social scientists are looking for threshold crossings and short-term consequences of long-term trends, we are particularly in need of high resolution dating, and as human-scale (annual to decadal) environmental indicators are becoming widespread, we need to be able to match scales with our natural science colleagues. Where possible, radiocarbon dating requires supplement (dendro, tephra, documents), and where radiocarbon necessarily provides most chronology, we need hundreds rather than dozens of dates for sites and phases and careful programs of Bayesian synthesis of existing age determinations. Getting scale-matching and chronology right is absolutely critical to any interdisciplinary effort.
2. *Partnerships beat data mining.* Because nobody can now effectively control all the disciplines needed to be genuinely interdisciplinary, there is a strong need to directly involve natural science partners in any archaeological global change effort. Other fields (notably paleoclimatology) are advancing rapidly, and last year's published synthetic overview may already be outdated: data mining by nonspecialists is particularly hazardous in the context of fast-changing global system science. Where chapters in

the present volume have weaknesses, it is usually when they borrow uncritically or cite decades-old articles from other disciplines. We know that the natural and physical science end of the global change research community needs us as active collaborators and not just our data sets, but we need them, too. Interacting teams will produce better results than any single grand synthesizer.

3. *Sustained longitudinal investigation works.* As we focus on global change issues, we repeatedly face questions about long-term sustainability (or “serial unsustainability,” to use Kohler’s term) in particular landscapes and ecosystems. The strongest chapters in this collection tend (in Crumley’s terms) to be “longitudinal”: that is, products of long-term research projects that have looked at long-term change in a single region, maintaining a geographic focus through a substantial time period. Projects that can connect prehistory with the rich documentary resources of later time periods have some particular advantages, but a simple dogged persistence in investigation of the dynamic interaction of a particular lake basin and humans through time may produce results more useful to global change questions than any number of temporally shallow, cross-regional comparisons. Our main contribution to global change research is the long-term perspective, and the sustained, regional, long-term approach may be one of our strongest research strategies for global change archaeology.
4. *Models work longitudinally.* Archaeologists have been both early consumers and producers of integrative models that incorporate proxy environmental and cultural vari-

ables in a variety of ways for a range of objectives. This volume provides several impressive examples of archaeological and environmental modeling, including potentially influential applications of agent-based modeling to wood resource consumption in the desert southwest. Such models work best with high densities of well-dated data points and produce their most convincing results in multicentury runs. These factors again point to the value of the longitudinal approach and the focus on particular landscapes over time.

5. *Archaeology trains for integration.* One of the things our discipline has done right over the past decades is to train several generations of investigators to integrate the evidence provided by different disciplines. Although archaeologists do sometimes narrowly specialize, usually they are quite ready to assemble a woodland from separate studies of bark fragments and tree root casts: going from trees to forest is natural within archaeology. We are generalists and integrators at heart, and this is reflected in the simplest summer project report as much as in the grandest synthesis. As the editors and contributors to *The Archaeology of Global Change* so ably demonstrate, these traits are now providing some real contributions beyond our discipline.

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